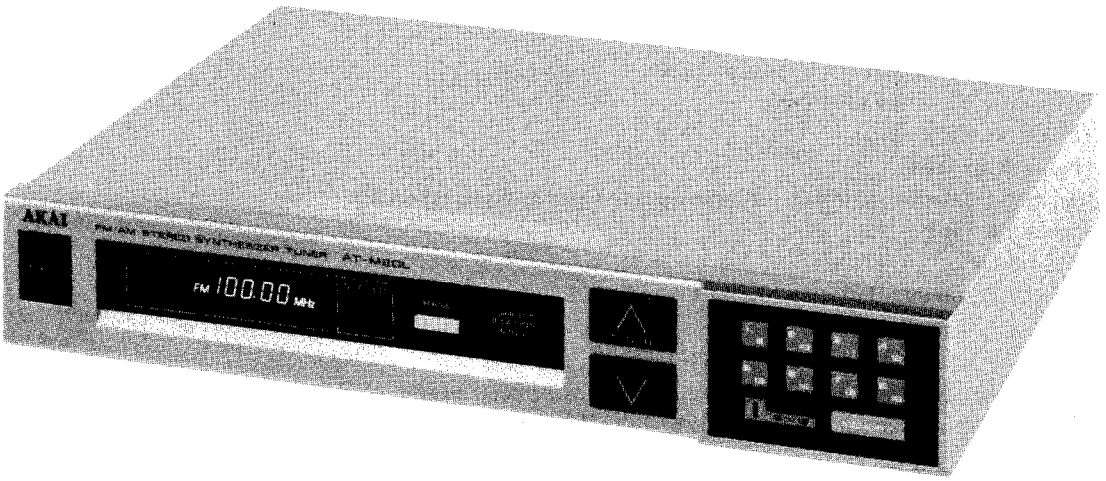


FM AM STEREO SYNTHSIZER TUNER

MODEL AT-M20/L

SECTION 1 SERVICE MANUAL 3
SECTION 2 PARTS LIST 13

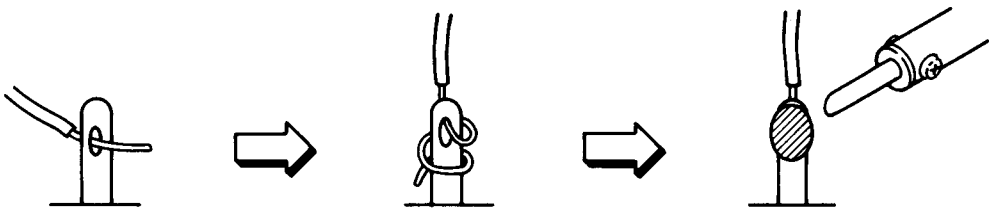
SAFETY INSTRUCTIONS

SAFETY CHECK AFTER SERVICING

Confirm the specified insulation resistance between power cord plug prongs and externally exposed parts of the set is greater than 10 Mohms, but for equipment with external antenna terminals (tuner, receiver, etc.) and is intended for [C] or [A], specified insulation resistance should be more than 2.2 Mohms (ground terminals, microphone jacks, headphone jacks. line-in-out jacks etc.)

PRECAUTIONS DURING SERVICING

1. Parts identified by the ⚠ symbol parts are critical for safety.
   Replace only with parts number specified.
2. In addition to safety, other parts and assemblies are specified for conformance with such regulations as those applying to spurious radiation. These must also be replaced only with specified replacements.
   Examples: RF converters, tuner units, antenna selector switches, RF cables, noise blocking capacitors, noise blocking filters, etc.
3. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads
4. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation Tape
   2) PVC tubing
   3) Spacers (Insulating Barriers)
   4) Insulation sheets for transistors
   5) Plastic screws for fixing microswitch (especially in turntable)
5. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.), wrap ends of wires securely about the terminals before soldering.

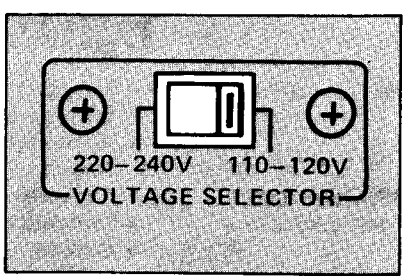


6. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.).
7. Check that replaced wires do not contact sharp edged or pointed parts.
8. Also check areas surrounding repaired locations.
9. Use care that foreign objects (screws, solder droplets, etc.) do not remain inside the set.

VOLTAGE CONVERSION

Models for Canada, USA, Europe, UK and Australia are not equipped with this facility. Each machine is preset at the factory according to destination, but some machines can be set to 110–120V, or 220–240V as required. If your machine's voltage can be converted:

1. Disconnect the power cord.
2. Set the VOLTAGE SELECTOR located on the rear panel, with a screwdriver, until the correct voltage is indicated.



SECTION 1

SERVICE MANUAL

TABLE OF CONTENTS

I. **SPECIFICATIONS** 4
II. **DISMANTLING OF UNIT** 5
III. **CONTROLS** 6
IV. **PRINCIPAL PARTS LOCATION** 7
V. **ELECTRICAL ADJUSTMENT** 8
1. PRIOR TO ELECTRICAL ADJUSTMENT 8
2. INSTRUMENT CONNECTIONS FOR TUNER ADJUSTMENT 8
3. FM ADJUSTMENT (Refer to Fig. 5-1 and 5-2) 9
4. AM (MW) ADJUSTMENT (Refer to Fig. 5-1 and 5-3) 10
5. LW ADJUSTMENT (for AT-M20L) (Refer to Fig. 5-1 and 5-3) 10

For basic adjustments, measuring methods, and operating principles, refer to GENERAL TECHNICAL MANUAL.

I. SPECIFICATIONS

FM TUNER SECTION

TUNING FREQUENCY RANGE	87.5MHz to 108.0MHz
USABLE SENSITIVITY (300 ohms)	11.2dBf
QUIETING SENSITIVITY (S/N = 50dB)	16.2dBf (Mono)/37.2dBf (Stereo)
CAPTURE RATIO	1.5dB
SELECTIVITY (±400kHz)	60dB
IMAGE REJECTION	78dB
IF REJECTION	85dB
SUPRIOUS REJECTION	90dB
AM SUPPRESSION	60dB
SUB CARRIER SUPPRESSION	60dB
S/N (IHF)	75dB (Mono)/65dB (Stereo)
T.H.D.	0.1% (Mono)/0.3% (Stereo)
STEREO SEPARATION (1kHz)	45dB

AM TUNER SECTION

	AM (MW for AT-M20L)	LW (for AT-M20L)
TUNING FREQUENCY RANGE	530kHz to 1610kHz for USA & CANADA 531kHz to 1602kHz for other countries	144kHz to 351kHz
USABLE SENSITIVITY (LOOP ANTENNA)	400μV/m	800μV/m
SELECTIVITY	50dB	50dB
IMAGE REJECTION	40dB	40dB
IF REJECTION	30dB	30dB
S/N	40dB	35dB
T.H.D.	1.0%	2.0%

OUTPUT SECTION

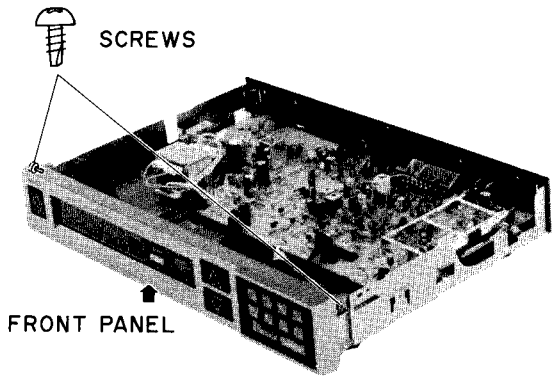
OUTPUT LEVEL	
FM	700mV (100% Mod.)
AM (MW FOR AT-M20L)	250mV (30% Mod.)
POWER REQUIREMENTS	120V, 60Hz for USA & Canada 220V, 50Hz for Europe except UK 240V, 50Hz for UK & Australia 110/120/220/240V, 50/60Hz switchable for other countries
DIMENSIONS	350(W) x 54(H) x 255(D)mm (13.8 x 2.1 x 10.0 inches)
WEIGHT	2.2kg (4.8 lbs)

* For improvement purposes, specifications and design are subject to change without notice.

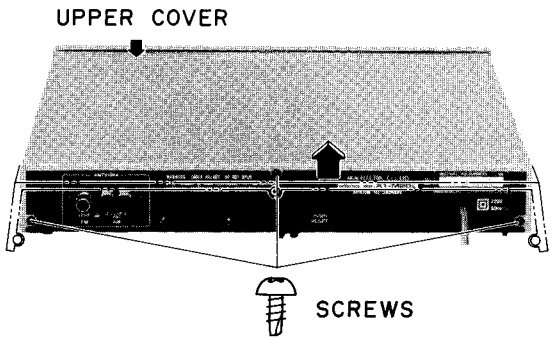
II. DISMANTLING OF UNIT

In case of trouble, etc. necessitating dismantling, please dismantle in the order shown in the photographs. Reassemble in reverse order.

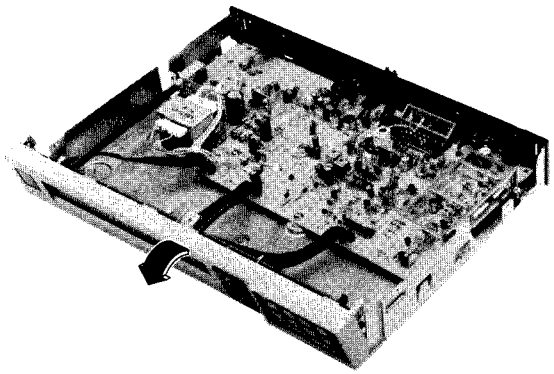
3



1

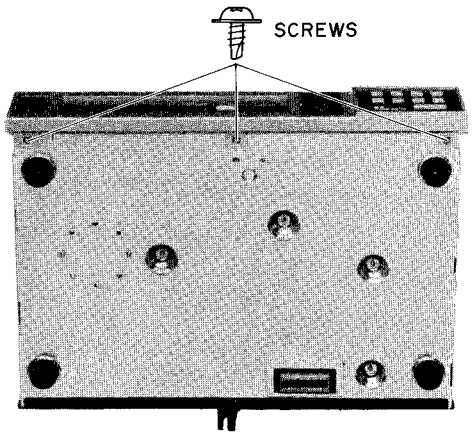


4

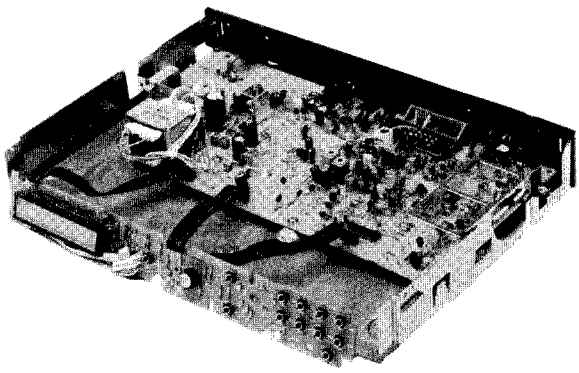


Release plastic hooks holding operation PCB

2



5



III. CONTROLS

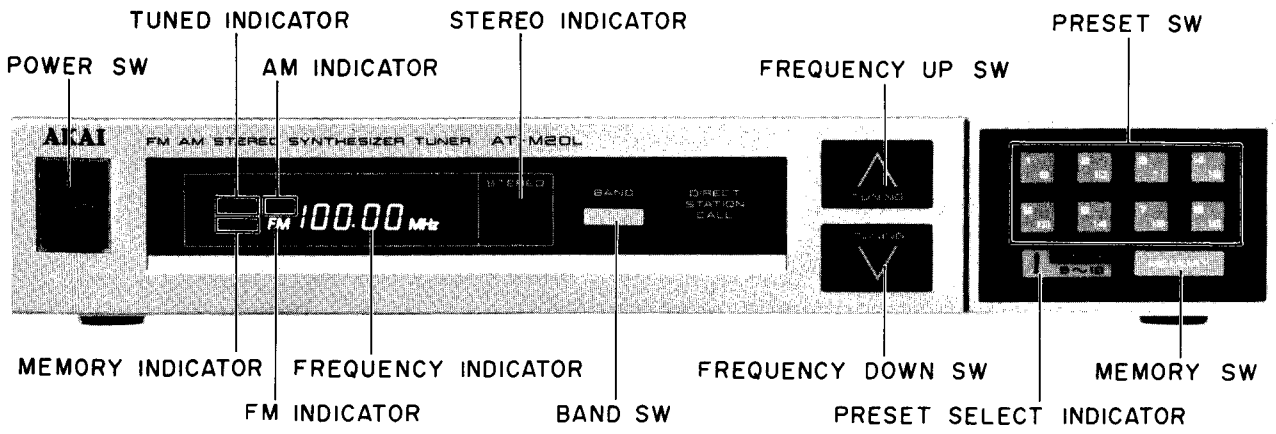


Fig. 3-1 Front View

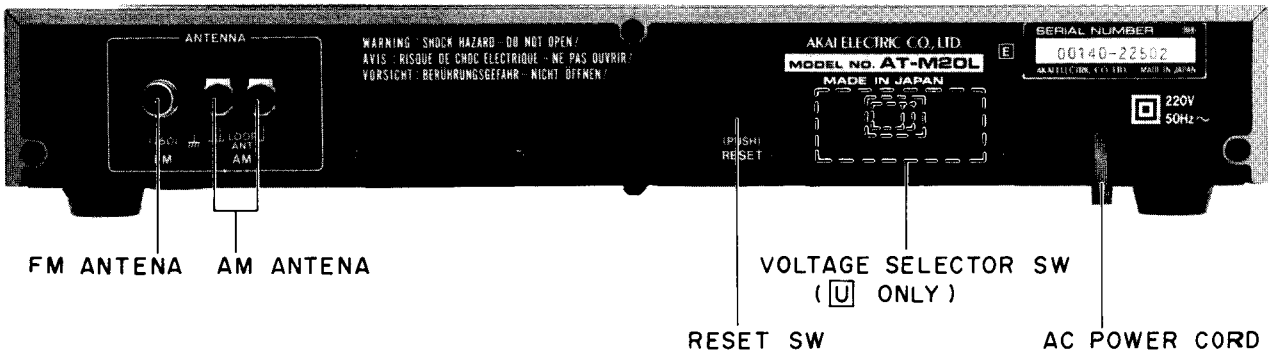


Fig. 3-2 Rear View

IV. PRINCIPAL PARTS LOCATION

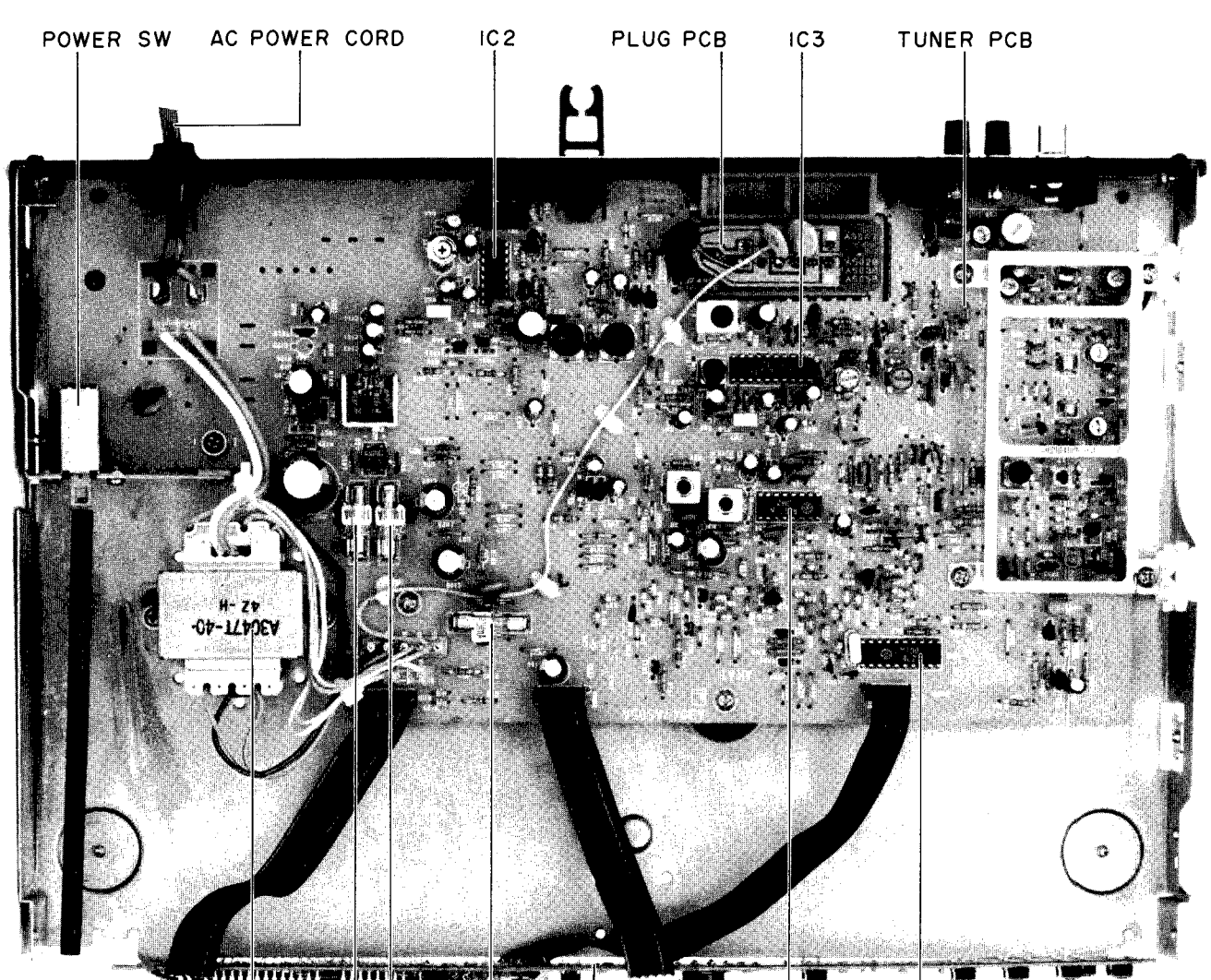


Fig. 4-1

V. ELECTRICAL ADJUSTMENT

5-1. PRIOR TO ELECTRICAL ADJUSTMENT

Press the Reset SW on the REAR PANEL, the internal frequency preset memory is set as.

CH1	FM 87.5MHz	FM 87.5MHz
CH2	AM 603kHz	AM 600kHz
CH3	AM 999kHz	AM 1000kHz
CH4	AM 1404kHz	AM 1400kHz
CH6	FM 90.0MHz	FM 90.0MHz
CH7	FM 98.0MHz	FM 98.0MHz
CH8	FM 106.0MHz	FM 10.6MHz
	(AM 9kHz Step model)	(AM 10kHz Step model)

5-2. INSTRUMENT CONNECTIONS AND ADJUSTMENT POINTS FOR TUNER ADJUSTMENT

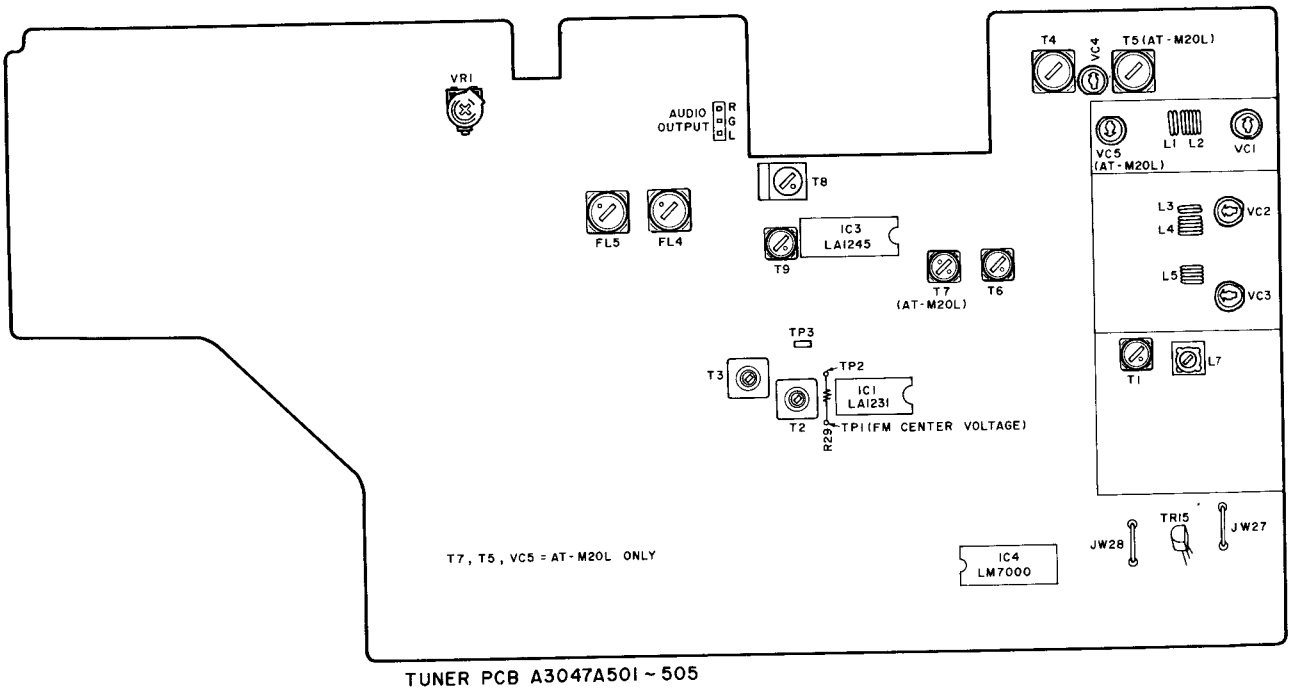


Fig. 5-1 TUNER PC BOARD ADJUSTMENT POINTS

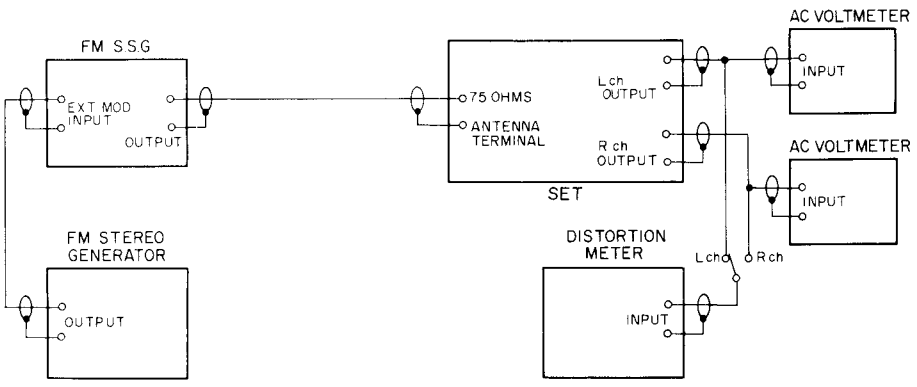


Fig. 5-2 Instrument Connections for FM Section Adjustment

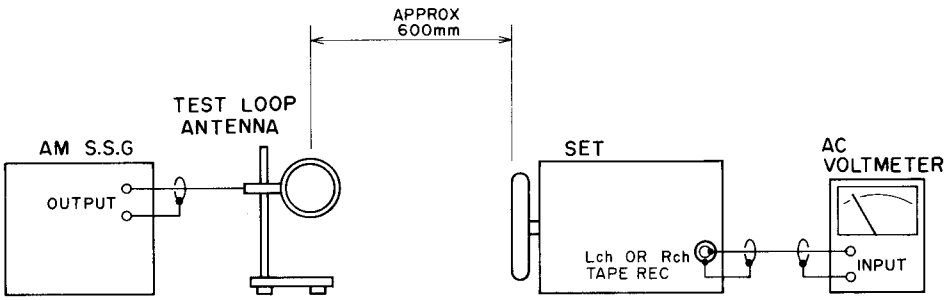


Fig. 5-3 Instrument Connections for AM (MW, LW) Section Adjustment

5-3. FM ADJUSTMENT (Refer to Figs. 5-1 and 5-2)

NOTES:
1. Set the internal modulation generator to 100% (75kHz dev.), 1kHz for [C], [A], [U], [S] models, 53.3% (40kHz dev.), 1kHz for [B], [E], [V] models.
2. Readjust step 2 to step 6, in case T1 is turned more than a quarter turn obtaining the proper distortion (STEREO).
3. Confirm that the sensitivity margin between Low and High Range sensitivities is within 3dB, otherwise readjust Low and High Range sensitivity.
4. 0dBμ = 1μV

Step	Adjustment Item	Adjustment Point	Result	Remarks
1	FM OSC	L7	12±0.2V	Set BAND to FM Display to 108.0MHz Connect DC Voltmeter to JW27.
2	FM Low Range Sensitivity	L1 or L5	Less than 6dBμ input from SSG	Connect TP3 to GND Display to 88.0MHz Within 3% Distortion Factor
3	FM HIGH Range Sensitivity	VC1, VC2, and VC3	Less than 6dBμ input from SSG	Display to 108.0MHz Within 3% Distortion Factor
4	For best Result, Repeat steps 2 and 3 two or three times			
5	FM CENTER VOLTAGE	T2	0V indication	Connect to DC Voltmeter between TP1 and TP2. Tune only noise without interference from broadcasting.
6	Distortion Factor (MONO)	T3	Less than 0.3%	88MHz, 60dBμ, MONO input. Display to 88MHz Confirm that the DC Voltage between TP2 and TP3 is within 0±0.025V.
7	For best Result, Repeat steps 5 and 6 two or three times.			
8	MUTE Sensitivity	Confirmation	NO Audio output	88MHz, MONO input Display to 88MHz Set the input level from SSG to 22dBμ (±12dB)
9	STEREO SEPARATION	VR1	More than 40dB	98MHz, 60dBμ, Stereo Lch (Rch) input. Display to 98MHz Minimum output of Rch (Lch)
10	Distortion (Stereo)	T1	Less than 0.5%	98MHz, 60dBμ, Stereo input Display to 98MHz.

5-4. AM (MW) ADJUSTMENT (Refer to Fig. 5-1 and 5-3)

NOTES:
1. Set the internal modulation signal generator to 30% 1kHz of each.
2. Confirm that the sensitivity margin between Low and High Range sensitivities is wihtin 6dBμ, otherwise readjust Low and High Range Sensitivity.
3. (kHz) in Result & Remakrs indicates the test frequencies in AM 10kHz STEP area.

Step	Adjustment Item	Adjustment Point	Result	Remarks
1	AM (MW) OSC	T6	6.7V±0.15V	Display to 1404kHz (1400kHz) Connect DC Voltmeter to JW28.
2	Low Range Sensitivity	T4	Less than 60dBμ input from SSG	603kHz (600kHz) input Display to 603kHz (600kHz) 10% Distortion Factor
3	High Range Sensitivity	VC4	Less than 60dBμ input from SSG	1404kHz (1400kHz) input Display to 1404kHz (1400kHz) 10% Distortion Factor
4	For best Result, Repeat Steps 2 and 3 two or three times.			
5	AM IF	T8, T9	Maximum output	603kHz, (600kHz) 74dBμ input Display to 603kHz (600kHz)
6	Distortion (Confirmation)	None	Less than 2%	999MHz (1000kHz) 74dB input Display to 999MHz (1000kHz)

5-5. LW ADJUSTMENT (for AT-M20L) (Refer to Fig 5-1 and 5-3)

NOTES:
1. Set internal modulation signal generator to 30%, 1kHz of each.
2. Confirm that the sensitivity margin between Low and High Range sensitivities is within 6dBμ, otherwise readjust Low and High Range sensitivity.

Step	Adjustment Item	Adjustment Point	Result	Remarks
1	LW OSC	T7	7.0V±0.15V	Display to 351kHz Connect DC Voltmeter to JW28
2	Low Range Sensitivity	T8	Less than 70dBμ input from SSG	160kHz input Display to 160kHz 10% Distortion Factor
3	High Range Sensitivity	VC5	Less than 70dBμ input from SSG	300kHz input Display to 300kHz 10% Distortion Factor
4	For best Result, Repeat steps 2 and 3 two or three times.			
5	Distortion Factor (Confirmation)	None	Less than 3.5%	200kHz, 74dBμ input Display to 200kHz

SECTION 2

PARTS LIST

TABLE OF CONTENTS

RECOMMENDED SPARE PARTS 15
1. PC BOARD BLOCK 16
2. TUNER PC BOARD 16
3. CONTROL PC BOARD 17
4. PLUG PC BOARD 17
5. ASSEMBLY BLOCK 18
6. FINAL ASSEMBLY BLOCK 19
INDEX 20

Resistor and Capacitor which is not listed in this parts list, please refer to COMMON LIST FOR SERVICE PARTS.

ATTENTION

1. When placing an order for parts, be sure to list the parts no. model no., and description of each part. If any of this information is omitted, there are instances in which parts cannot be shipped or the wrong parts will be delivered.
2. Please be careful not to make a mistake in the parts no. If the parts no. is in error, a part different from the one ordered may be delivered.
3. Because part numbers and part definitions and supply in the Preliminary Parts List may have been the subject of changes, please use this parts list for all future reference.

HOW TO USE THIS PARTS LIST

1. This Parts List shows those parts which are considered necessary for repairs. Other parts, such as resistors and capacitors, are shown in the "Common List for Service Parts" from which these parts should be selected and parts.
2. The Recommended Spare Parts List shows those parts in the Parts List which are considered particularly important for service.
3. Parts not shown in the Parts List and "Common List for Service Parts" will not in principle be supplied.
4. How to read the parts list

a) Mechanism Block

2. HEAD BASE BLOCK

REF. NO.	PART NO.	DESCRIPTION
2-1x	BH-T2023A320A	HEAD BASE BLOCK GX-F66R
2-2	HP-H2206A010A	HEAD R/P PR4-8FU C
2-3	ZS-477876	PAN20×03STL CMT
2-4	ZS-536488	BID20×08STL CMT
2-5	ZG-402895	CS ANGLE ADJUST SPRING

SP (Service Parts) Classification

A small "x" indicates the inability to show that particular part in the Photo or Illustration.

This number corresponds with the individual parts index number in that figure

This number corresponds with the Figure Number

b) P.C Board Block

6. SYS. CON. P C BOARD BLOCK

REF. NO.	PART NO.	DESCRIPTION
6-1	BA-T2034A070A	PC SYS CON BLK GX-F44R
6-IC1	EI-324536	IC HD14049BP
6-IC2	EI-336801	IC MB8841-564M
6-IC3	EI-331661	IC SN7405N
6-IC4	EI-336725	IC M54527P
6-TR1to4	ET-200985	TR 2SC2603 F,G
6-TR5to28	ET-554657	TR 2SA733A P,Q
6-D1	ED-318292	D SILICON H 1S2473T-77 T26
6-D2to4	ED-308952	D GERMA V 1K34A-LR F07
6-D5to10	ED-318292	D SILICON H 1S2473T-77 T26
6-X1	EI-318384	OSC X'TAL NC-18C 3.579545MHZ

SP (Service Parts) Classification

These reference symbols correspond with component symbols in the Schematic Diagrams.

5. The kind of part and its installation position can both be determined by the Part Number. To determine where a part number is listed, utilize the Parts Index at the end of the Parts List. It is necessary first of all to find the Part Number. This can be accomplished by using the Reference Number listed at the right of the part number in the Parts Index.

WARNING

⚠ INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURE'S RECOMMENDED PARTS

AVERTISSEMENT

⚠ IL INDIQUE LES COMPOSANTS CRITIQUES DE SÉCURITÉ. POUR MAINTENIR LE DEGRÉ DE SÉCURITÉ DE L'APPAREIL, NE REMPLACER QUE DES PIÈCES RECOMMANDEES PAR LE FABRICANT

RECOMMENDED SPARE PARTS

Because, if the parts listed below are on hand, almost any repair can be accomplished, we suggest that you stock these Recommended Spare Parts Items.

REF. NO.	PART NO.	DESCRIPTION
1	BT-354948	⚠ TRANS POWER A3047T-20 (A)
2	BT-354946	⚠ TRANS POWER A3047T-30 (C)
3	BT-354949	⚠ TRANS POWER A3047T-40 (E,V)
4	BT-354950	⚠ TRANS POWER A3047T-50 (B,S)
5	BT-354945	⚠ TRANS POWER A3047T-70 (U)
6 N	EC-357142	C DOUBLE LAYER EECW5R5F 473
7	EC-336865	C S-FIX H CTZ51C136 3.0-10
8	EC-356284	C S-FIX H VCT51G136A 7.5-50
9	ED-345555	⚠ D SILICON DBB10C 200/1.0A
10 N	ED-336805	⚠ D SILICON DS135D-KB1 200/1.0A
11	ED-328486	⚠ D ZENER H HZ15 3
12	ED-313623	⚠ D ZENER H HZ22 3
13	ED-321269	D LED GL5PR6 RED
14	ED-358924	D LED SLP-436B-50 YELLOW
15	ED-301911	D SILICON H DS448
16	ED-344280	D SILICON H GMA-01-FY2 F05
17	ED-348205	D SILICON V MC931 DOUBLE
18	ED-353692	D VARACTER SVC321 C,D DOUBLE
19	ED-336832	D VARACTOR SVC211SP
20	ED-349448	D VARACTOR 1SV147 [V]
21	ED-346614	D ZENER H HZ12 A1
22	ED-309069	D ZENER H HZ6 B2
23	EF-339903	⚠ FUSE SEMKO T 125MA 250V [E,V,B,S]
24	EF-668474	⚠ FUSE SEMKO T 400MA 250V [E,V,B,S]
25	EF-308933	⚠ FUSE TSC A 250V 0.20A [U]
26	EF-309390	⚠ FUSE TSC 125V 0.50A [C,A]
27	EH-344434	FILTER CE BFU450C4N 0.450MHz
28	EH-315407	FILTER CE SFE10.7MMKA 10.7MHz
29	EH-355568	FILTER CE SFE10.7MS2GY-A
30	EH-349059	FILTER LC LP 10PD
31	EH-359176	FILTER LC 64-5032-11
32 N	EI-354944	IC A3047
33	EI-322248	IC LA1231N
34	EI-202218	IC LA1245
35	EI-349963	IC LA3410
36 N	EI-354951	IC LM7000
37	EI-348409	OSC CE CSB400P 0.4MHz
38	EI-349970	OSC CE CSB456F11 0.456MHz
39	EI-344422	OSC X'TAL HC-18/U 7.200000MHz
40	EJ-350918	PLUG CONNECTER M1690 12P
41	EJ-344423	TERMINAL W/SCREW YKD31-0133 P 2P
42	EM-353670	IND FL 8-BT-29ZK CHARACTER
43	EO-352089	COIL OSC 2 7BRS-9098X 580.0UH
44	EO-348209	COIL OSC 2 7NR-8646Y 115.0UH
45	EO-349456	COIL OSC 2 7NRS-9153Z 150.0UH [AT-M20L]
46	EO-337598	COIL VARI 2 25A-1353-01
47	EO-337599	COIL VARI 2 25A-1354-03
48	ES-337902	⚠ SW PUSH SDLD1P002 01-1
49	ES-349464	⚠ SW SLIDE 00120319 01-2 [U]
50	ES-344439	⚠ SW SLIDE 00420451 2-04-02 [U]
51	ES-344445	SW TACT EVQ-QHR12B
52	ES-336780	SW TACT SKHHAA082A
53	ET-354364	TR DTC143TS [AT-M20L]
54	ET-349449	TR FET 2SK161 O,Y
55	ET-351853	TR FET 2SK161 Y
56	ET-352408	TR FET 2SK192A GR [AT-M20L]
57	ET-337759	TR FET 2SK246 GR
58	ET-337743	TR FET 3SK107 E
59 N	ET-353899	TR 2SA1317 S,T,U
60	ET-308141	TR 2SC2603 G
61	ET-338410	TR 2SC2878 A,B [AT-M20L]
62	ET-336869	TR 2SC2999 C,D
63	ET-336935	TR 2SC3000 D2,E,F
64 N	ET-353898	TR 2SC3330
65	ET-349081	TR 2SC3383 S,T
66	ET-328265	TR 2SC930 F
67	ET-349459	TR 2SD1406 O,Y,GR
68	EV-345784	R S-FIX H RVF8P01 3P 304

"NOTE" N: New Parts

SYMBOL FOR DESTINATION

[A] : AAL (USA)
[B] : UK (England)
[C] : CSA (Canada)
[E] : CEE (Japan)
[S] : SAA (Australia)
[U] : U/T (Universal Area)
[V] : VDE (West Germany)

1. PC BOARD BLOCK

REF. NO.	PART NO.	DESCRIPTION
1-1U	BA-A3047A020A	PC TUNER BLK AT-M20 (U)
1-1C	BA-A3047A020B	PC TUNER BLK AT-M20 (C,A)
1-1E	BA-A3047A020C	PC TUNER BLK AT-M20 (E)
1-1V	BA-A3047A020D	PC TUNER BLK AT-M20 (V)
1-1S	BA-A3047A020F	PC TUNER BLK AT-M20 (S)
1-1L	BA-A3047A020E	PC TUNER BLK AT-M20L (E,B)
1-2U	BA-A3047A030A	PC CONTROL BLK AT-M20 (U)
1-2C	BA-A3047A030B	PC CONTROL BLK AT-M20 (C,A)
1-2E	BA-A3047A030C	PC CONTROL BLK AT-M20 (E,V,S)
1-2L	BA-A3047A030D	PC CONTROL BLK AT-M20L (E,B)

NOTE:
PC TUNER BLK consists of TUNER PC BOARD and PLUG PC BOARD.

2. TUNER PC BOARD

REF. NO.	PART NO.	DESCRIPTION
	TUNER PC BOARD	
2-IC1	EI-322248	IC LA1231N
2-IC2	EI-349963	IC LA3410
2-IC3	EI-202218	IC LA1245
2-IC4	EI-354951	IC LM7000
2-TR1	ET-337743	TR FET 3SK107 E
2-TR2	ET-336869	TR 2SC2999 C,D
2-TR3,4	ET-328265	TR 2SC930 F
2-TR7,8	ET-349081	TR 2SC3383 S,T
2-TR9	ET-338410	TR 2SC2878 A,B [AT-M20L ONLY]
2-TR10	ET-352408	TR FET 2SK192A GR [AT-M20L ONLY]
2-TR11,12	ET-308141	TR 2SC2603 G [AT-M20L ONLY]
2-TR13	ET-353898	TR 2SC3330
2-TR14	ET-349081	TR 2SC3383 S,T
2-TR15	ET-337759	TR FET 2SK246 GR
2-TR16	ET-351853	TR FET 2SK161 Y
2-TR17,18	ET-336935	TR 2SC3000 D2,E,F
2-TR19	ET-353898	TR 2SC3330
2-TR20,21	ET-349081	TR 2SC3383 S,T
2-TR22	ET-353899	TR 2SA1317 S,T,U
2-TR23,24	ET-353898	TR 2SC3330
2-TR25	ET-349081	TR 2SC3383 S,T [V]
2-TR26	ET-349459	⚠ TR 2SD1406 O,Y,GR
2-TR27	ET-353898	⚠ TR 2SC3330
2-TR28	ET-353899	TR 2SA1317 S,T,U
2-TR29	ET-353898	TR 2SC3330
2-TR30	ET-336935	TR 2SC3000 D2,E,F
2-TR31	ET-354364	TR DTC143TS [AT-M20L ONLY]
2-TR32	ET-353898	TR 2SC3330
2-TR33	ET-349449	TR FET 2SK161 O,Y
2-D1A	ED-336832	D VARACTOR SVC211SP [U,C,A,E,B,S]
2-D1B	ED-349448	D VARACTOR 1SV147 [V]
2-D2A	ED-336832	D VARACTOR SVC211SP [U,C,A,E,B,S]
2-D2B	ED-349448	D VARACTOR 1SV147 [V]
2-D3A	ED-336832	D VARACTOR 2SVC211SP [U,C,A,E,B,S]
2-D3B	ED-349448	D VARACTOR 1SV147 [V]
2-D4A	ED-336832	D VARACTOR SVC211SP [U,C,A,E,B,S]
2-D4B	ED-349448	D VARACTOR 1SV147 [V]
2-D5	ED-344280	D SILICON H GMA-01-FY2 F05
2-D6	ED-301911	D SILICON H DS448
2-D9,10	ED-353692	D VARACTOR SVC321 C,D DOUBLE
2-D11 to 13	ED-344280	D SILICON H GMA-01-YF2 F05
2-D14	ED-348205	D SILICON V MC931 DOUBLE
2-D15,16	ED-344280	D SILICON H GMA-01-FY2 F05
2-D17	ED-301911	D SILICON H DS448
2-D18 to 21	ED-344280	D SILICON H GMA-01-FY2 F05
2-D22,23	ED-328486	⚠ D ZENER H HZ15 3
2-D24,25	ED-309069	D ZENER H HZ6 B2
2-D26	ED-346614	D ZENER H HZ12 A1
2-D27	ED-313623	⚠ D ZENER H HZ22 3
2-D28	ED-336805	⚠ D SILICON DS135D-KB1 200/1.0A
2-D29	ED-354555	⚠ D SILICON DBB10C 200/1.0A
2-D30 to 33	ED-344280	D SILICON H GMA-01-FY2 F05
2-D35 to 41	ED-344280	D SILICON H GMA-01-FY2 F05
2-D42	ED-301911	D SILICON H DS448
2-FL1	EH-315407	FILTER CE SFE10.7MMKA 10.7MHz
2-FL2	EH-355568	FILTER CE SFE10.7MS2GY-A
2-FL3	EH-359176	FILTER LC 64-5032-11 [V]
2-FL4,5	EH-349059	FILTER LC LP 10PD
2-FL6	EH-344434	FILTER CE BFU450C4N 0.450MHz
2-L1	EO-349461	COIL FIX 2 LINK
2-L2	EO-349462	COIL FIX 2 U147
2-L3	EO-349461	COIL FIX 2 LINK
2-L4,5	EO-349462	COIL FIX 2 U147
2-L6	EO-336934	COIL FIX 1 LAL03KH 2R2M
2-L7	EO-349446	COIL OSC 2 TFE2-OSC-U
2-L8	EO-353753	COIL FIX 2 OSC
2-L9	EO-338409	COIL LF FK0B160MH02 250UH [V]
2-SW1	ES-337902	⚠ SW PUSH SDLD1P002 01-1
2-SW2	ES-349464	⚠ SW SLIDE 00120319 01-2 [U]
2-SW3	ES-344439	SW SLIDE 00420451 2-04-02 [U]
2-SW4	ES-344445	SW TACT EVQ-QHR12B
2-TM1	EJ-344423	TERMINAL W/SCREW YKD31-0133 P 2P
2-T1	EO-337640	COIL IFT 119AC-15533X 10.7MHz
2-T2	EO-349452	COIL DET 2 78-1045-01
2-T3	EO-349453	COIL DET 2 78-1046-01 [AT-M20L ONLY]
2-T4	EO-337598	COIL VARI 2 25A-1353-01
2-T5	EO-337599	COIL VARI 2 25A-1354-03 [AT-M20L ONLY]
2-T6	EO-348209	COIL OSC 2 7NR-8646Y 115.0UH [AT-M20]
2-T6L	EO-349456	COIL OSC 2 7NRS-9153Z 150.0UH [AT-M20L]
2-T7	EO-352089	COIL OSC 2 7BRS-9098X 580.0UH [AT-M20L ONLY]
2-T8	EO-356732	COIL IFT BCFLZ-450A
2-T9	EO-202216	COIL IFT 7MC-6733C 460.0kHz
2-VC1 to 3	EC-336865	C S-FIX H CTZ51C136 3.0-10
2-VC4	EC-356284	C S-FIX H VCT51G136A 7.5-50
2-VC5	EC-356284	C S-FIX H VCT51G136A 7.5-50 [AT-M20L ONLY]
2-VR1	EV-345784	R S-FIX H RVF8P01 3P 304
2-X1	EI-349970	OSC CE CSB456F11 0.456MHz
2-X2	EI-344422	OSC X'TAL HC-18/U 7.200000kHz
2-R25	ER-306805	⚠ R CB H S15 RDS 1/2W 101J
2-R26	ER-327710	⚠ R CB H S10 FS RDS 1/4W 151J
2-R29	ER-333387	⚠ R CB H S10 FS RDS 1/4W 223J
2-R43	ER-306805	⚠ R CB H S15 RDS 1/2W 101J
2-R45,46	ER-324337	⚠ R CB H S10 FS RDS 1/4W 560J
2-R70	ER-324185	⚠ R CB H S10 FS RDS 1/4W 221J
2-R80	ER-324184	⚠ R CB H S10 FS RDS 1/4W 121J
2-R101	ER-327710	⚠ R CB H S10 FS RDS 1/4W 151J
2-R121	ER-323074	⚠ R CB H S10 FS RDS 1/4W 102J
2-R127,128	ER-358614	⚠ R OMF H S10 FS RSM 1/2W 560J
2-R131,132	ER-200940	⚠ R CB H S10 FS RDS 1/4W 561J
2-R133	ER-358616	⚠ R OMF S10 FS RSM 1/2W 561J
2-R135	ER-200940	R CB H S10 FS RDS 1/4W 561J
2-R140	ER-356573	⚠ R SD ANTI-STATIC 1/2W 225K [C,A]
2-C46U	EC-355171	C PP V S05 CQMFS92 331J 50DC [U,S]
2-C46C	EC-355168	C PP V S05 CQMFS92 431J 50DC [C,A]
2-C46E	EC-355167	C PP V S05 CQMFS92 201J 50DC [E,V,B]

REF. NO.	PART NO.	DESCRIPTION
2-C47U	EC-355171	C PP V S05 CQMFS92 331J 50DC [U,S]
2-C47C	EC-355168	C PP V S05 CQMFS92 431J 50DC [C,A]
2-C47E	EC-355167	C PP V S05 CQMFS92 201J 50DC [E,V,B]
2-C48,49	EC-355170	C PP V S05 CQMFS92 181J 50DC [U]
2-C61	EC-355168	C PP V S05 CQMFS92 431J 50DC
2-C62	EC-355169	C PP V S05 CQMFS92 271J 50DC [AT-M20L ONLY]
2-C97	EC-201750	C EC V CUT USM 102M 35.0DC
2-C108	EC-320548	⚠ C CE V F 103Z 250AC
2-C109U	EC-320548	⚠ C CE V F 103Z 250AC [U]
2-C109C	EC-338411	⚠ C CE V FZ 103P 400AC [C,A]
2-C109E	EC-338496	⚠ C CE V FZ 472P 400AC [E,V,B,S]
2-C128	EC-355166	C STY V S05 CQFS 101J 125DC
	ASSEMBLY BLOCK	
2-F1U	EF-308933	⚠ FUSE TSC A 250V 0.20A [U]
2-F2C,F3C	EF-309390	⚠ FUSE TSC 125V 0.50A [C,A]
2-F2E,F3E	EF-668474	⚠ FUSE SEMKO T 400MA 250V [E,V,B,S]
2-F4E	EF-339903	⚠ FUSE SEMKO T 125MA 250V [E,V,B,S]

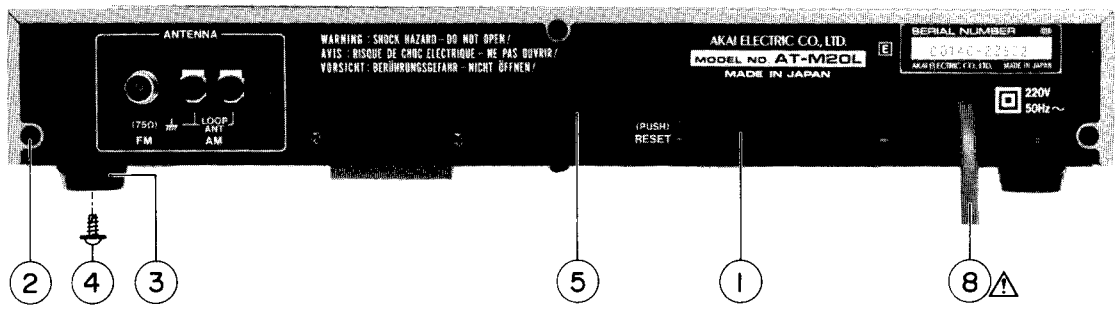
3. CONTROL PC BOARD

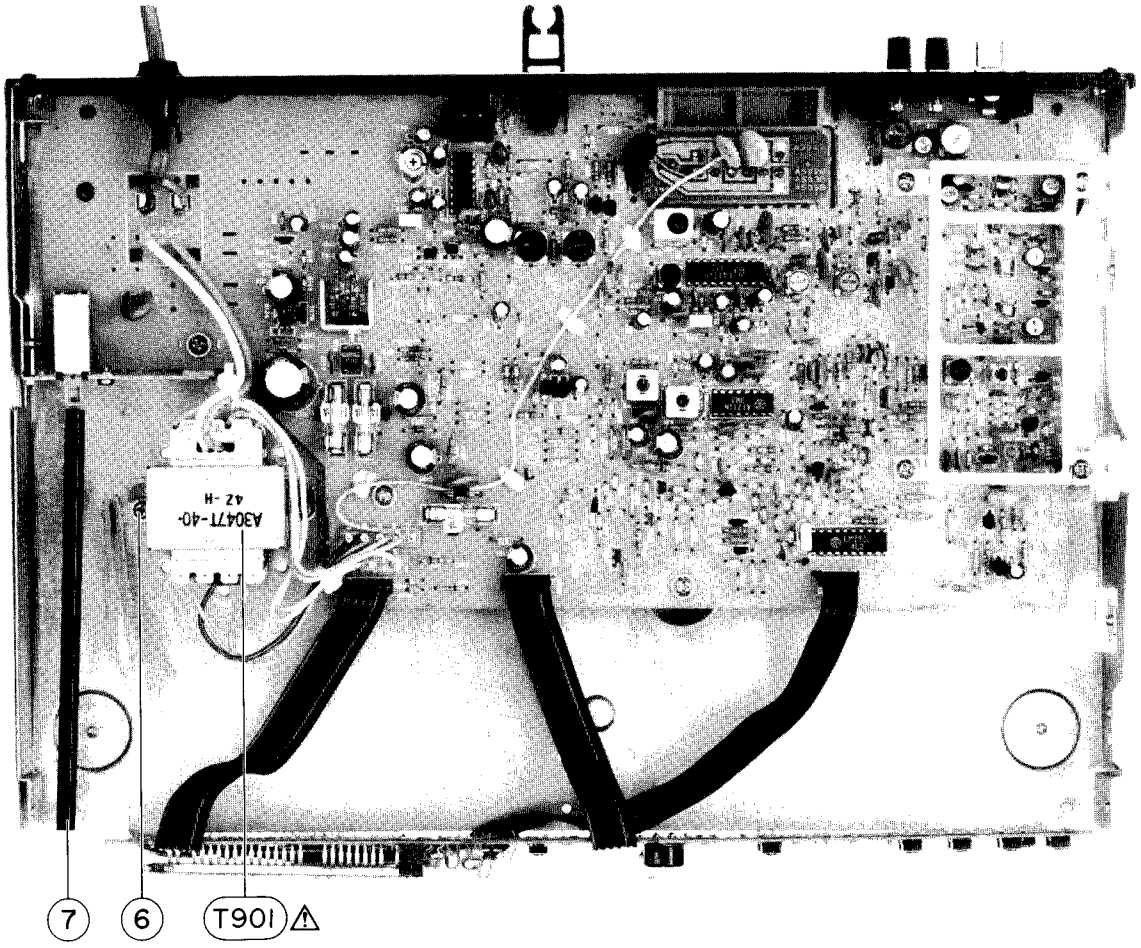
REF. NO.	PART NO.	DESCRIPTION
3-IC1	EI-354944	IC A3047
3-TR1	ET-353899	TR 2SA1317 S,T,U [U]
3-D1	ED-321269	D LED GL5PR6 RED
3-D2	ED-358924	D LED SLP-436B-50 YELLOW
3-D3,4	ED-344280	D SILICON H GMA-01-FY2 F05
3-D5	ED-301911	D SILICON H DS448
3-D6	ED-344280	D SILICON H GMA-01-FY2 F05
3-D7	ED-301911	D SILICON H DS448
3-D8,9	ED-344280	D SILICON H GMA-01-FY2 F05
3-D10	ED-344280	D SILICON H GMA-01-FY2 F05 [AT-M20L ONLY]
3-D11	ED-344280	D SILICON H GMA-01-FY2 F05 [U,E,V,B,S]
3-D12	ED-344280	D SILICON H GMA-01-FY2 F05 [C,A]
3-D14	ED-344280	D SILICON H GMA-01-FY2 F05 [U]
3-SW1 to 12	ES-336780	SW TACT SKHHAA082A
3-X1	EI-348409	OSC CE CSB400P 0.4MHz
3-IN1	EM-353670	IND FL 8-BT-29ZK CHARACTER
3-IB1	EH-355260	COMP R RGLD12x104K
3-IB2	EH-355261	COMP R RGLD3x104K
3-C3	EC-357142	C DOUBLE LAYER EECW5R5F 473

4. PLUG PC BOARD

REF. NO.	PART NO.	DESCRIPTION
4-P1	EJ-350918	PLUG CONNECTER M1690 12P

ASSEMBLY BLOCK

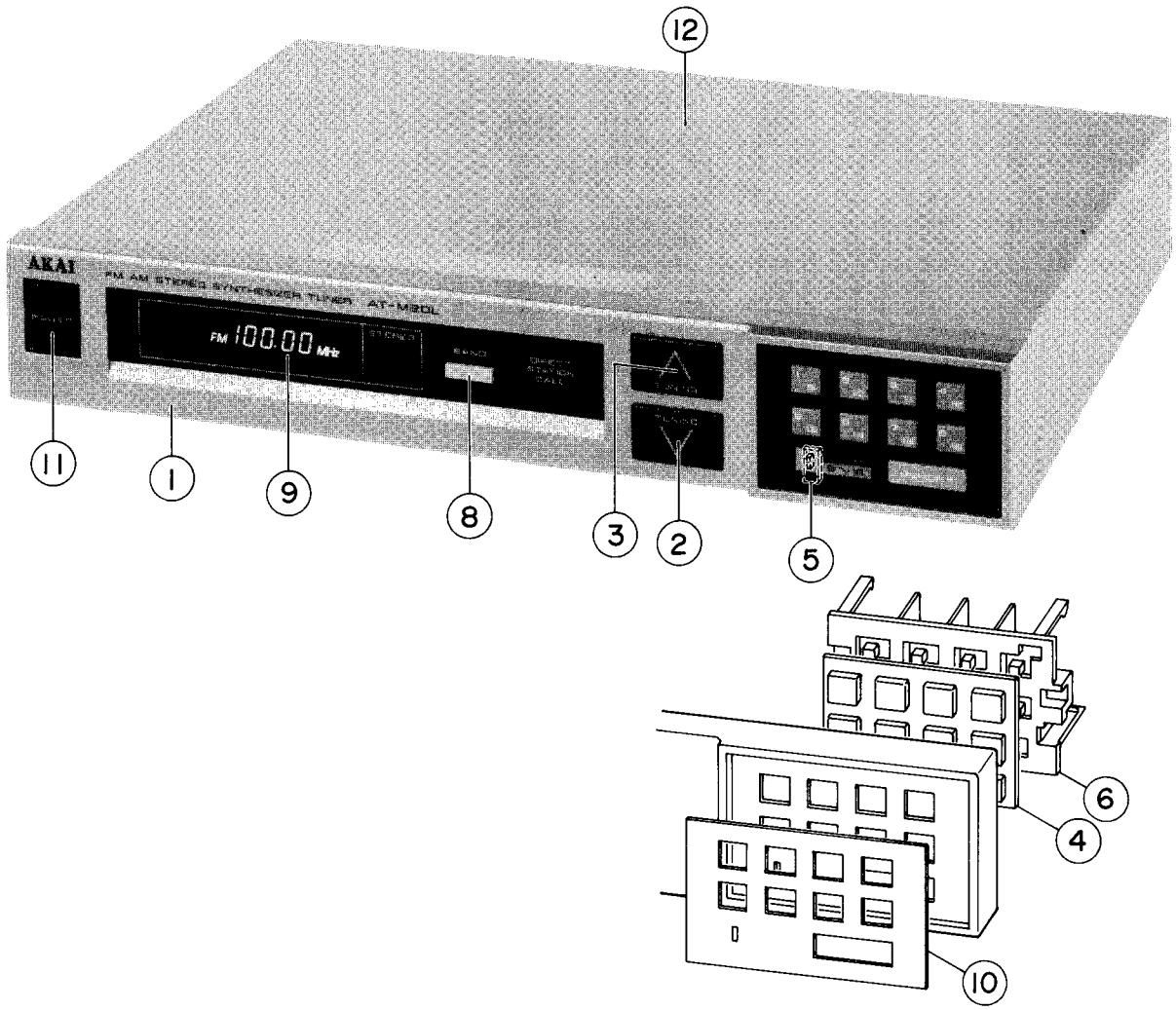




5. ASSEMBLY BLOCK

REF. NO.	PART NO.	DESCRIPTION
5-1U	SP-356752G	PANEL REAR AT-M20 (U))
5-1C	SP-356752H	PANEL REAR AT-M20 (A,C)
5-1E	SP-356752J	PANEL REAR AT-M20 (E,V)
5-1S	SP-356752K	PANEL REAR AT-M20 (S)
5-1LE	SP-356752L	PANEL REAR AT-M20L (E)
5-1LB	SP-356752M	PANEL REAR AT-M20L (B)
5-2	ZS-308846	T2BR30x08STL BZN PROJECTION
5-3	SA-202118	FOOT
5-4	ZS-331567	T2BR30x08STL CMT C080
5-5	SZ-332739	HOLDER ANTENNA
5-6	ZS-315511	ST PAN30x06STL CMT CUP
5-7	TA-356754A	JOINT (A)
5-8U	EW-355032	⚠ AC CORD 2 CORES KP-224, VFF-CB U/T [U]
5-8C	EW-359248	⚠ AC CORD 2 CORES KP-8, SPT-1-CB T2 UC [C,A]
5-8E	EW-355033	⚠ AC CORD 2 CORES KP-419C, LTCE-2F-CBEV [E,V]
5-8S	EW-355035	⚠ AC CORD 2 CORES KP-560, LTSA-2F-CB S [S]
5-8B	EW-355034	⚠ AC CORD 2 CORES LTBS-2F-CB B [B]
5-9x	EE-337976	ANT LOOP LA-200A
5-T901U	BT-354945	⚠ TRANS POWER A3047T-70 (U)
5-T901C	BT-354946	⚠ TRANS POWER A3047T-30 (C)
5-T901A	BT-354948	⚠ TRANS POWER A3047T-20 (A)
5-T901E	BT-354949	⚠ TRANS POWER A3047T-40 (E,V)
5-T901B	BT-354950	⚠ TRANS POWER A3047T-50 (B,S)

FINAL ASSEMBLY BLOCK



6. FINAL ASSEMBLY BLOCK

REF. NO.	PART NO.	DESCRIPTION
	PANEL FRONT BLOCK	
6-1	BD-A3047A040A	PANEL FRONT BLK AT-M20
6-1L	BD-A3047A040B	PANEL FRONT BLK AT-M20L
6-1B	BD-A3047A040C	PANEL FRONT BLK AT-M20-B
6-1LB	BD-A3047A040D	PANEL FRONT BLK AT-M20L-B
6-2	SK-354926C	KNOB TUNING (3)
6-3	SK-354926D	KNOB TUNING (4)
6-4	SK-354929B	KNOB PRESET-S
6-4B	SK-354929C	KNOB PRESET-B
6-5	SE-351703	WINDOW LED
6-6	SE-354930	ESCUTCHEON KEY
6-7x	ZS-310984	PT BR30X08STL CMT [ESCUTCHEON KEY FIX]
6-8	SK-354927A	KNOB BAND
6-9	SP-354931B	WINDOW FLD (2)
6-10	SZ-354928B	MASK FRONT-S
6-10B	SZ-354928C	MASK FRONT-B
6-11	SK-343017F	KNOB POWER-B
	FINAL ASSEMBLY BLOCK	
6-12	SP-350862G	COVER UPPER-S
6-12B	SP-350862H	COVER UPPER-B
6-13x	EJ-352118	SOCKET COAX PAL B2-714P-900

NOTE:
PANEL FRONT BLK consists of 6-1 to 6-11.

SYMBOL FOR COLOR VARIATION
NON : STANDARD COLOR
B or BL : BLACK

INDEX

PART NO.	REF. NO.	PART NO.	REF. NO.	PART NO.	REF. NO.	PART NO.	REF. NO.	PART NO.	REF. NO.
BA-A3047A020A	1-1U	EF-308933	2-F1U	ET-328265	2-TR3				
BA-A3047A020B	1-1C	EF-309390	2-F2C	ET-336869	2-TR2				
BA-A3047A020C	1-1E	EF-309390	2-F3C	ET-336935	2-TR30				
BA-A3047A020D	1-1V	EF-339903	2-F4E	ET-336935	2-TR17				
BA-A3047A020E	1-1L	EF-668474	2-F2E	ET-336935	2-TR18				
BA-A3047A020F	1-1S	EF-668474	2-F3E	ET-337743	2-TR1				
BA-A3047A030A	1-2U	EH-315407	2-FL1	ET-337759	2-TR15				
BA-A3047A030B	1-2C	EH-344434	2-FL6	ET-338410	2-TR9				
BA-A3047A030C	1-2E	EH-349059	2-FL4	ET-349081	2-TR25				
BA-A3047A030D	1-2L	EH-349059	2-FL5	ET-349081	2-TR7				
BD-A3047A040A	6-1	EH-355260	3-IB1	ET-349081	2-TR8				
BD-A3047A040B	6-1L	EH-355261	3-IB2	ET-349081	2-TR21				
BD-A3047A040C	6-1B	EH-355568	2-FL2	ET-349081	2-TR14				
BD-A3047A040D	6-1LB	EH-359176	3-FL3	ET-349081	2-TR20				
BT-354945	5-T901U	EI-202218	3-IC3	ET-349449	2-TR33				
BT-354946	5-T901C	EI-322248	3-IC1	ET-349459	2-TR26				
BT-354948	5-T901A	EI-344422	3-X2	ET-351853	2-TR16				
BT-354949	5-T901E	EI-348409	3-X1	ET-352408	2-TR10				
BT-354950	5-T901B	EI-349963	3-IC2	ET-353898	2-TR23				
EC-201750	2-C97	EI-349970	2-X1	ET-353898	2-TR24				
EC-320548	2-C108	EI-354944	3-IC1	ET-353898	2-TR27				
EC-320548	2-C109U	EI-354951	2-IC4	ET-353898	2-TR32				
EC-336865	2-VC1	EJ-344423	2-TM1	ET-353898	2-TR29				
	to VC3	EJ-350918	4-P1	ET-353898	2-TR13				
EC-338411	2-C109C	EJ-352118	6-13x	ET-353898	2-TR19				
EC-338496	2-C109E	EM-353670	3-IN1	ET-353899	2-TR28				
EC-355166	2-C128	EO-202216	2-T9	ET-353899	2-TR22				
EC-355167	2-C46E	EO-336934	2-L6	ET-353899	2-TR1				
EC-355167	2-C47E	EO-337598	2-T4	ET-354364	2-TR31				
EC-355168	2-C46C	EO-337599	2-T5	EV-345784	2-VR1				
EC-355168	2-C47C	EO-337640	2-T1	EW-355032	5-8U				
EC-355168	2-C61	EO-338409	2-L9	EW-355033	5-8E				
EC-355169	2-C62	EO-348209	2-T6	EW-355034	5-8B				
EC-355170	2-C48	EO-349446	2-L7	EW-355035	5-8S				
EC-355170	2-C49	EO-349452	2-T2	EW-359248	5-8C				
EC-355171	2-C46U	EO-349453	2-T3	SA-202118	5-3				
EC-355171	2-C47U	EO-349456	2-T6L	SE-351703	6-5				
EC-356284	2-VC4	EO-349461	2-L1	SE-354930	6-6				
EC-356284	2-VC5	EO-349461	2-L3	SK-343017F	6-11				
EC-357142	3-C3	EO-349462	2-L4	SK-354926C	6-2				
ED-301911	2-D17	EO-349462	2-L2	SK-354926D	6-3				
ED-301911	2-D42	EO-349462	2-L5	SK-354927A	6-8				
ED-301911	2-D6	EO-352089	2-T7	SK-354929B	6-4				
ED-301911	3-D5	EO-353753	2-L8	SK-354929C	6-4B				
ED-301911	3-D7	EO-356732	2-T8	SP-350862G	6-12				
ED-309069	2-D24	ER-200940	2-R131	SP-350862H	6-12B				
ED-309069	2-D25	ER-200940	2-R132	SP-354931B	6-9				
ED-313623	2-D27	ER-200940	2-R135	SP-356752G	5-1U				
ED-321269	3-D1	ER-306805	2-R25	SP-356752H	5-1C				
ED-328486	2-D22	ER-306805	2-R43	SP-356752J	5-1E				
ED-328486	2-D23	ER-323074	2-R121	SP-356752K	5-1S				
ED-336805	2-D28	ER-324184	2-R80	SP-356752L	5-1LE				
ED-336832	2-D1A	ER-324185	2-R70	SP-356752M	5-1LB				
	to D4A	ER-324337	2-R45	SZ-332739	5-5				
ED-344280	2-D18	ER-324337	2-R46	SZ-354928B	6-10				
	to D21	ER-327710	2-R26	SZ-354928C	6-10B				
ED-344280	2-D30	ER-327710	2-R101	TA-356754A	5-7				
	to D33	ER-333387	2-R29	ZS-308846	5-2				
ED-344280	2-D35	ER-356573	2-R140	ZS-310984	6-7x				
	to D41	ER-358614	2-R127	ZS-315511	5-6				
ED-344280	2-D5	ER-358614	2-R128	ZS-331567	5-4				
ED-344280	2-D11	ER-358616	2-R133						
	to D13	ES-336780	3-SW6						
ED-344280	2-D15	ES-336780	3-SW1						
ED-344280	2-D16	ES-336780	3-SW4						
ED-344280	3-D3	ES-336780	3-SW2						
ED-344280	3-D4	ES-336780	3-SW3						
ED-344280	3-D6	ES-336780	3-SW5						
ED-344280	3-D8	ES-336780	3-SW10						
	to D12	ES-336780	3-SW11						
ED-344280	3-D14	ES-336780	3-SW12						
ED-344555	2-D29	ES-336780	3-SW7						
ED-346614	2-D26	ES-336780	to SW9						
ED-348205	2-D14	ES-337902	2-SW1						
ED-349448	2-D1B	ES-344439	2-SW3						
	to D4B	ES-344445	2-SW4						
ED-353692	2-D10	ES-349464	2-SW2						
ED-353692	2-D9	ET-308141	2-TR11						
ED-358924	3-D2	ET-308141	2-TR12						
EE-337976	5-9	ET-328265	2-TR4						

AKAI

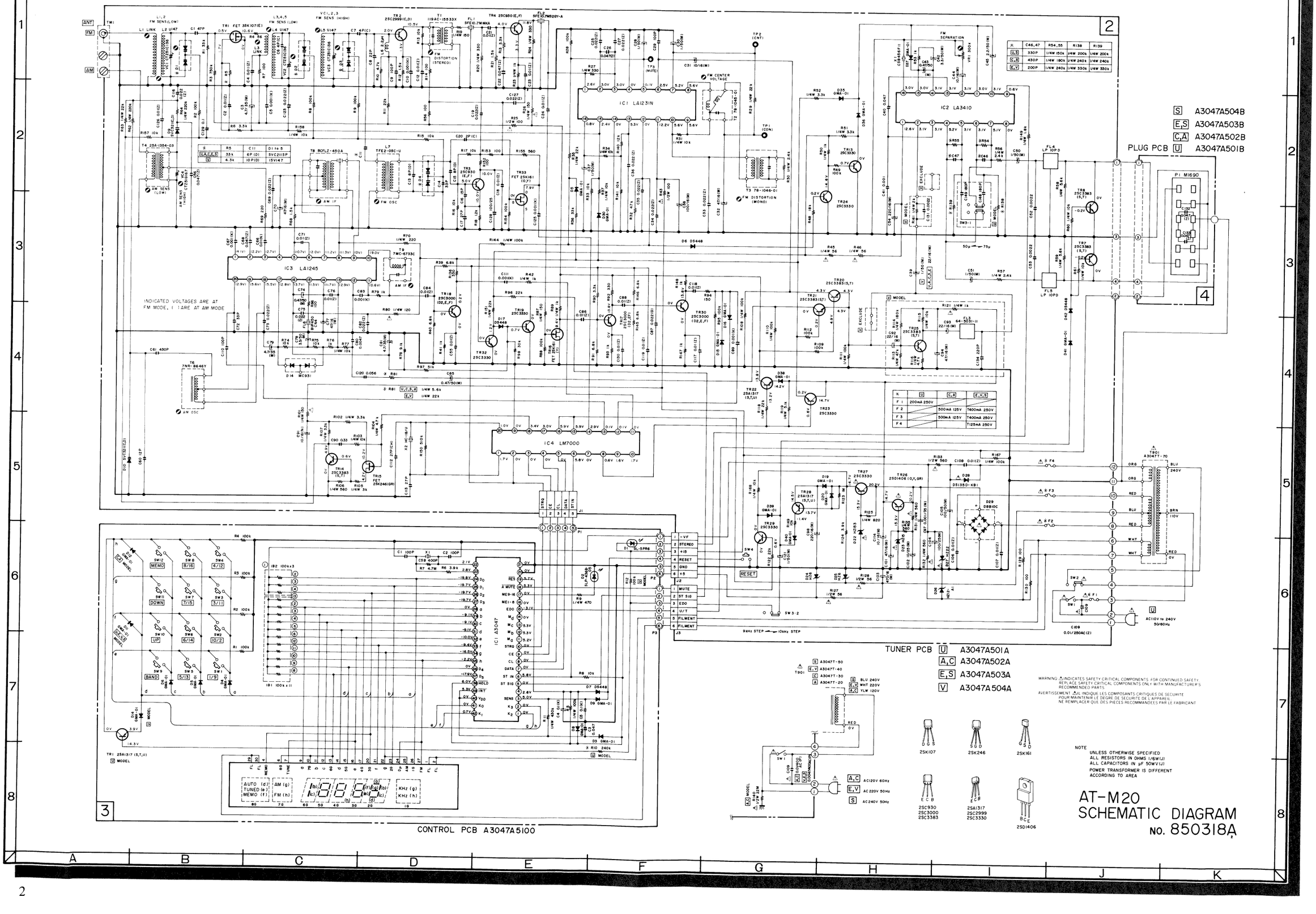
MODEL AT-M20/L

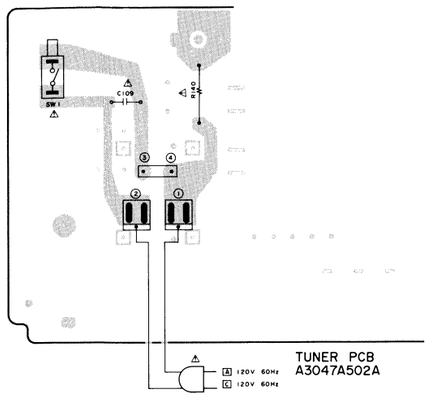
SCHEMATIC DIAGRAM AND PC BOARDS

1. A3047 1
2. AT–M20 SCHEMATIC DIAGRAM 2
3. AT–M20 TUNER PCB, PLUG PCB, CONTROL PCB 3
4. AT–M20L SCHEMATIC DIAGRAM 4
5. AT–M20L TUNER PCB, PLUG PCB, CONTROL PCB 5
6. LA1231, LA3410, LA1245, LM7000 6

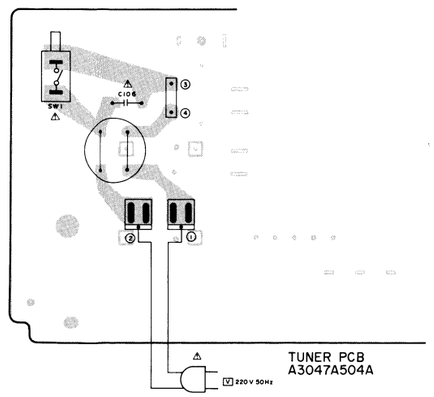
A3047

Pin	PORT NAME	DESCRIPTION
1	K2	Key scan input from Key matrix
2	K3	
3	SENS	Power ON detect input
5	$\overline{\text{STSIG}}$	IF signal input or muting signal input for detecting the station during auto-tuning. (active L)
6	$\overline{\text{STIN}}$	Auto tuning stop input from PLL IC (active L)
7	DATA	Transfer data to PLL IC
8	CL	Clock output to PLL IC (⌐)
9	CE	Chip enable output for selecting PLL IC (active H)
10	STRQ	Stop request output to PLL IC for IF amplifier function and IF frequency count down (active H)
15	EDO	150 m sec output when Keys depressed (except MEMORY KEY) NO output when from Back-up mode.
17	ME9–16	Indicator output for 9~16ch Preset memory rewriting
18	$\overline{\text{AMUTE}}$	Audio mute output when band changed, tuning up/down, from back-up mode and preset memory reading.
19	$\overline{\text{RES}}$	Reset input
20	TEST	Connect to GND
21	VSS	Connect to GND
22	OSC1	Oscillator for clock
23	OSC2	
24	D0	Digit output for Indicator and Key scanning (active H)
25	D1	
26	D2	
27	D3	
28	a	Segment output for Indicator
29	b	
30	c	
31	d	
32	e	
33	f	
34	g	
35	h	
36	D4	Digit output for Indicator and Key scanning (active H)
37	D5	
38	$\overline{\text{HOLD}}$	Internal RAM hold input (active L)
39	$\overline{\text{INT}}$	Interupt request input
40	VDD	Power input (+5V)
41	K0	Key scan input from Key matrix
42	K1	

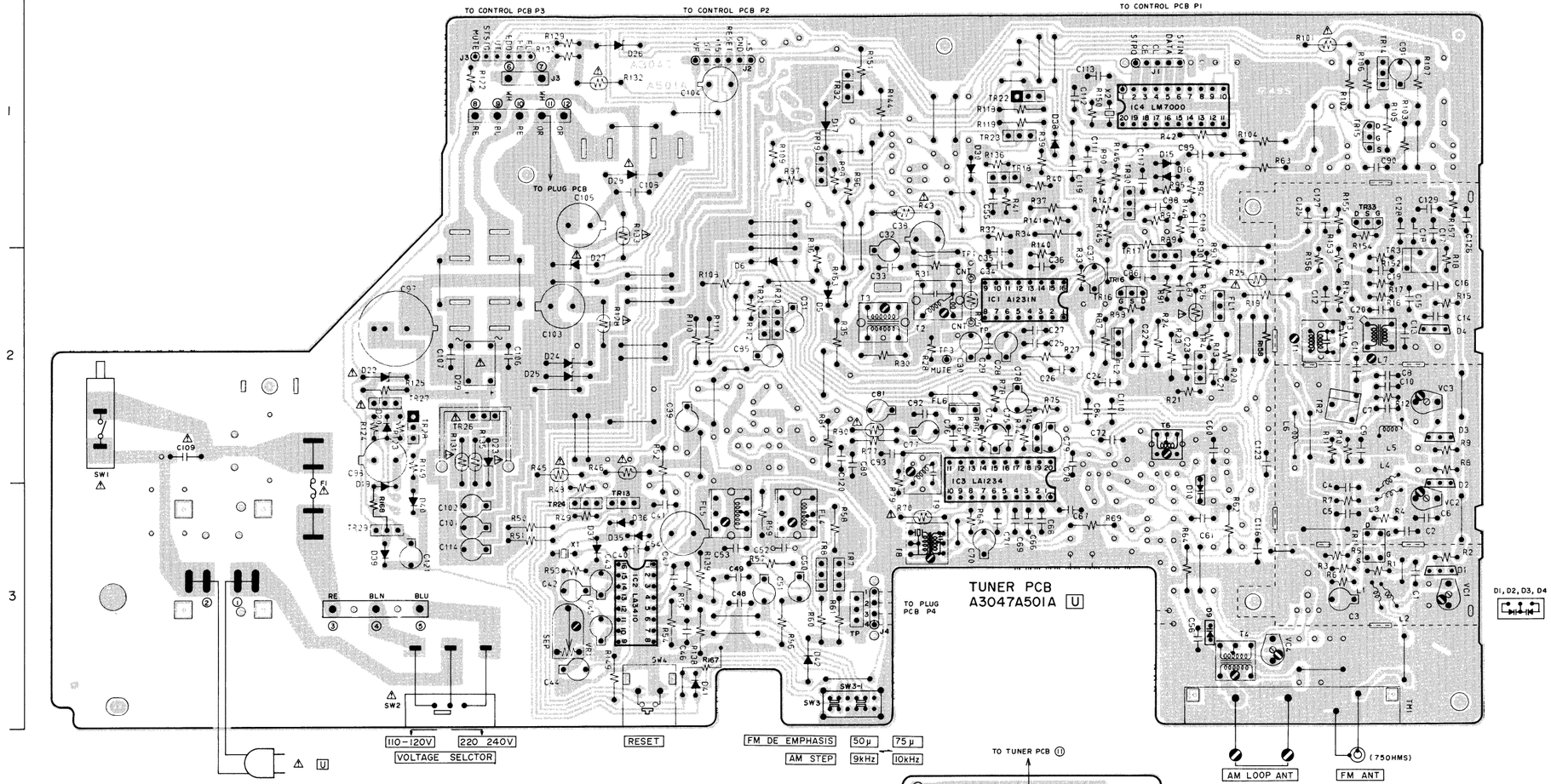

ANT
FM
AM
IC1 LA1231N
IC2 LA3410
IC3 LA1245
IC4 LM7000
IC1 A3047
INDICATED VOLTAGES ARE AT FM MODE, ( ) ARE AT AM MODE
FM SEPARATION
FM CENTER VOLTAGE
FM DISTORTION (STEREO)
FM DISTORTION (MONO)
AM IF
FM IF
AM OSC
FM OSC
AM SENS (LOW)
FM SENS (LOW)
FM SENS (HIGH)
PLUG PCB
S A3047A504B
E,S A3047A503B
C,A A3047A502B
U A3047A501B
P1 MI690
TUNER PCB
U A3047A501A
A,C A3047A502A
E,S A3047A503A
V A3047A504A
CONTROL PCB A3047A5100
AC110V to 240V 50/60Hz
WARNING ⚠ INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.
AVERTISSEMENT ⚠ IL INDIQUE LES COMPOSANTS CRITIQUES DE SECURITE POUR MAINTENIR LE DEGRE DE SECURITE DE L'APPAREIL NE REMPLACER QUE DES PIECES RECOMMANDEES PAR LE FABRICANT
NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN OHMS 1/6W(J)
ALL CAPACITORS IN µF 50WV(J)
POWER TRANSFORMER IS DIFFERENT ACCORDING TO AREA
AT-M20
SCHEMATIC DIAGRAM
NO. 850318A



TUNER PCB
A3047A502A



TUNER PCB
A3047A504A



LOCATION OF COMPONENTS

ICs
IC1.....2D
IC2.....3C
IC3.....2D
IC4.....1D

TRs
TR1.....3E
TR2,3,4....2E
TR7,8,13....3C
TR16,17....2D
TR18.....1D
TR19.....1C
TR20,21....2C
TR22,23....1D
TR24.....3B
TR26,27,28..2B
TR29.....3B
TR30.....1D
TR32.....1C
TR33.....1E

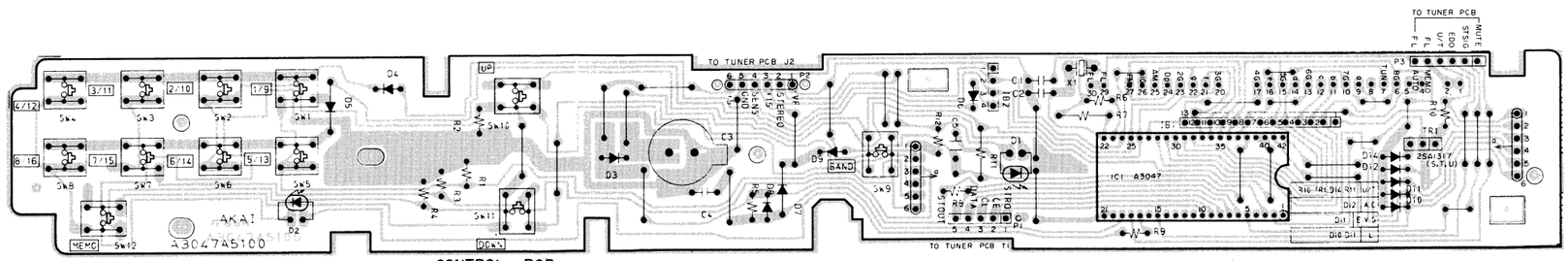
TR1.....2SK107(E)
TR2.....2SC2999(C,D)
TR3,4.....2SC930
TR7,8,20....2SC3383(S,T)
TR13,19,23,24,27,29,32
.....28C3330
TR16.....2SK161(Y)
TR17,18,30..2SC3000(D2,E,F)
TR22,28.....2SA1317(S,T,U)
TR26.....2SD1406(O,Y,GR)
TR33.....2SK161(O,Y)

= PNP TRANSISTOR
= NPN TRANSISTOR

PLUG PCB A3047A501B U
A3047A502B C,A
A3047A503B E,S
A3047A504B V

WARNING: ⚠INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS

AVERTISSEMENT: ⚠IL INDIQU LES COMPOSANTS CRITIQUES DE SÛRETÉ. POUR MAINTENIR LE DEGRE DE SECURITE DE L'APPAREIL NE REMPLACER LES CONPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SECURITE QUE PAR DES PIECES RECOMMANDEES PAR LE FABRICANT

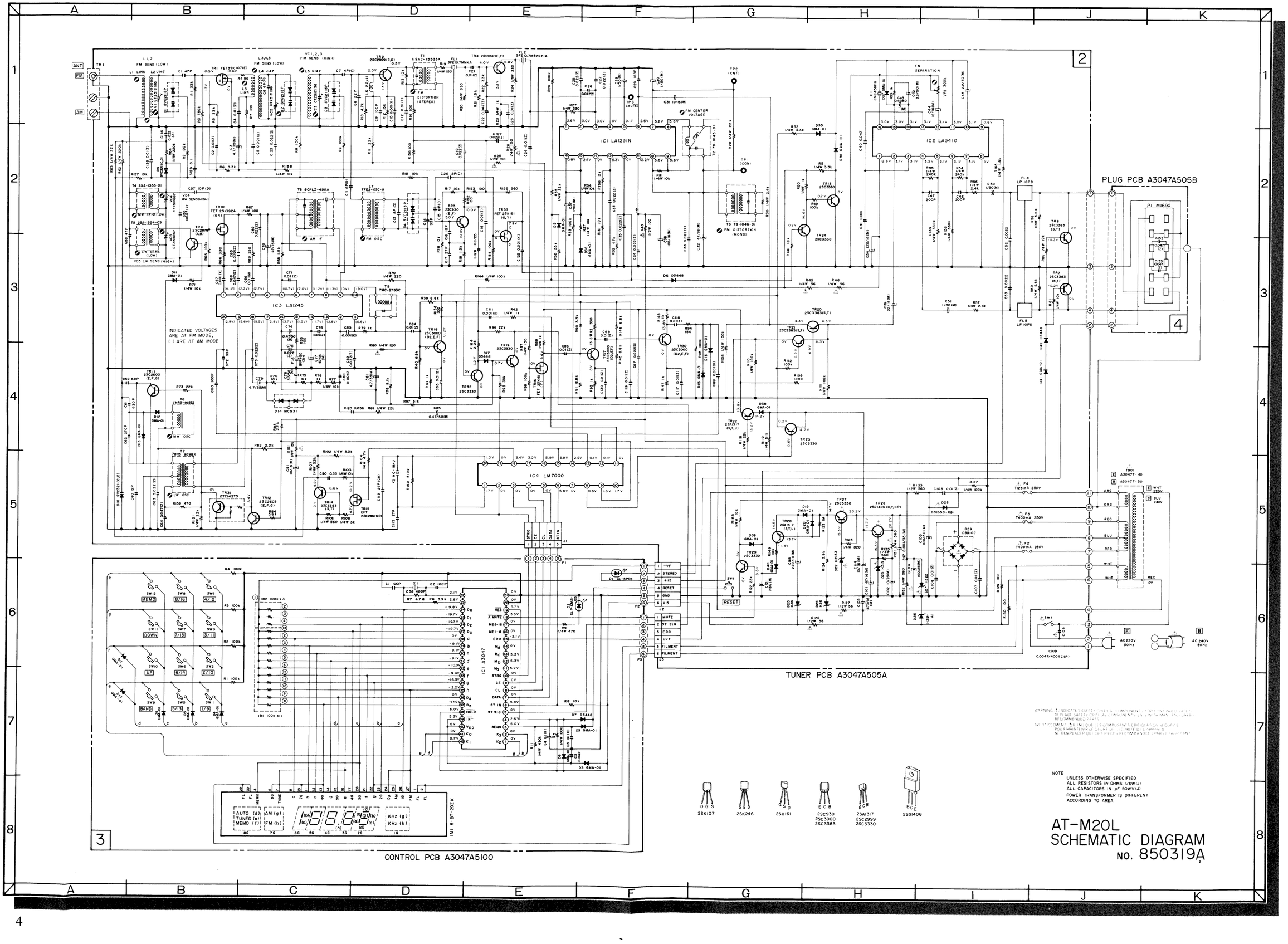


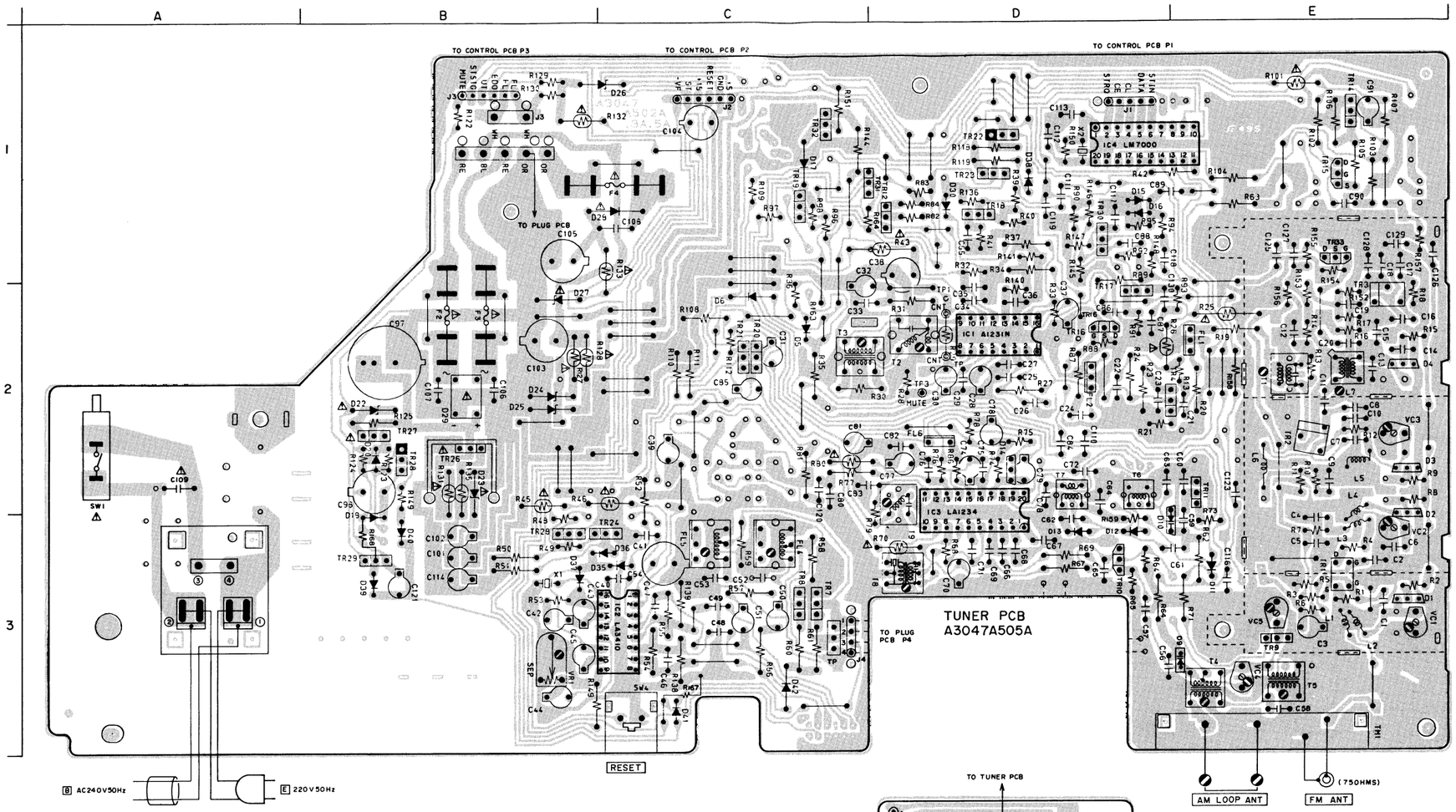
CONTROL PCB

2SA1317

TR1-----2SA1317(S,T,U)

= NPN TRANSISTOR


PLUG PCB A3047A505B
TUNER PCB A3047A505A
CONTROL PCB A3047A5100
IC1 LA1231N
IC2 LA3410
IC3 LA1245
IC4 LM7000
IC1 A3047
INDICATED VOLTAGES ARE AT FM MODE, ( ) ARE AT AM MODE
FM SEPARATION
FM CENTER VOLTAGE
FM DISTORTION (MONO)
FM DISTORTION (STEREO)
AM IF
FM IF
MW SENS (HIGH)
MW SENS (LOW)
LW SENS (HIGH)
LW SENS (LOW)
MW OSC
LW OSC
FM SENS (HIGH)
FM SENS (LOW)
AM SENS (HIGH)
AM SENS (LOW)
MEMO
DOWN
UP
BAND
8/16
7/15
6/14
5/13
4/12
3/11
2/10
1/9
AUTO (d)
TUNED (e)
MEMO (f)
AM (g)
FM (h)
KHz (g)
KHz (h)
RESET
AC 220V 50Hz
AC 240V 50Hz
2SK107
2SK246
2SK161
2SC930 2SC3000 2SC3383
2SA1317 2SC2999 2SC5330
2SD1406
NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN OHMS 1/6W(J)
ALL CAPACITORS IN μF 50WV(J)
POWER TRANSFORMER IS DIFFERENT ACCORDING TO AREA
AT-M20L
SCHEMATIC DIAGRAM
NO. 850319A2



LOCATION OF COMPONENTS

ICs	
IC1.....2D	
IC2.....3C	
IC3.....2D	
IC4.....1D	
TRs	
TR1.....3E	
TR2,3,4....2E	
TR7,8.....3C	
TR9.....3E	
TR10.....3D	
TR11.....2E	
TR12.....1D	
TR13.....3C	
TR16,17....2D	
TR18.....1D	
TR19.....1C	
TR20,21....2C	
TR22,23....1D	
TR24.....3B	
TR26,27,28.2B	
TR29.....3B	
TR30.....1D	
TR32.....1C	
TR33.....1E	

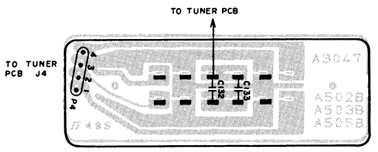
TR1.....3SK107(E)
TR2.....2SC2999(C,D)
TR3,4.....2SC930(E,F)
TR7,8,20...2SC3383(S,T)
TR9.....2SC2878(A,B)
TR10.....2SK192A(G,R)
TR11,12,19.2SC2603(E,F,G)
TR13,23....2SC3330
TR16.....2SK161(Y)
TR17,18....2SC3000(D2,E,F)
TR22.....2SA1317(S,T,U)

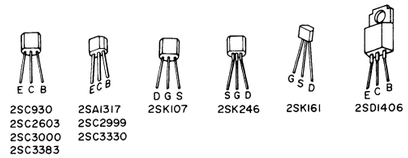
= PNP TRANSISTOR

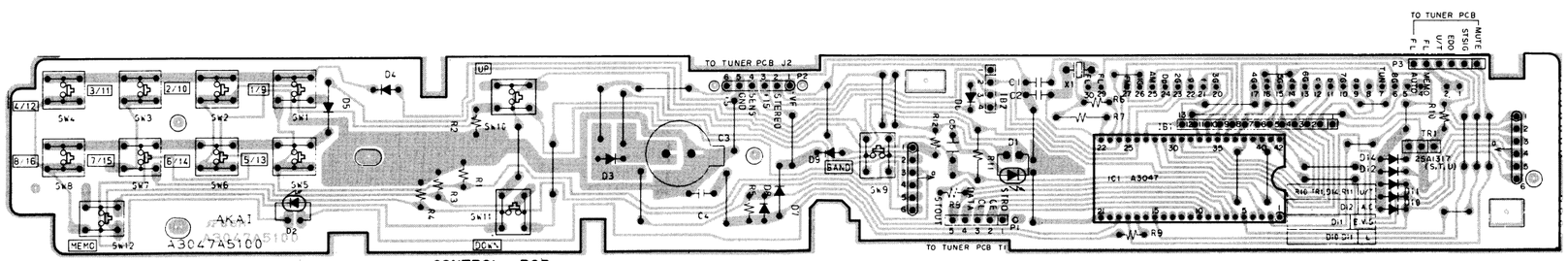
= NPN TRANSISTOR

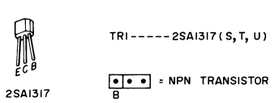
WARNING: ⚠INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS

AVERTISSEMENT: ⚠IL INDIQU LES COMPOSANTS CRITIQUES DE SÛRETÉ. POUR MAINTENIR LE DEGRÉ DE SECURITE DE L'APPAREIL NE REMPLACER LES CONPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SECURITE QUE PAR DES PIECES RECOMMANDEES PAR LE FABRICANT





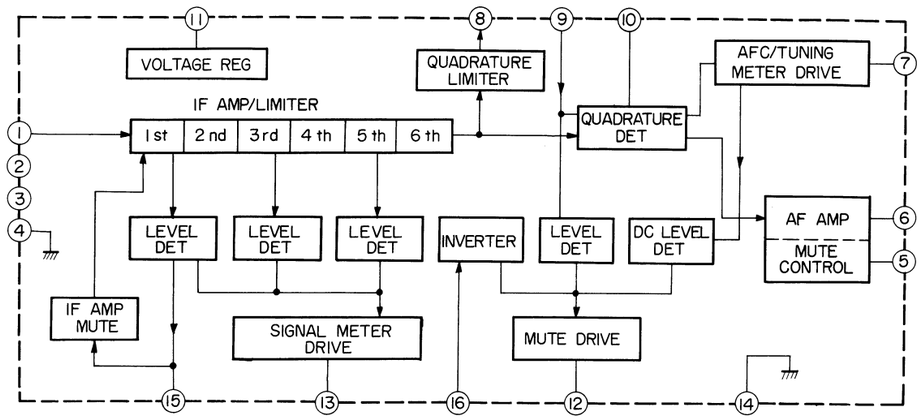




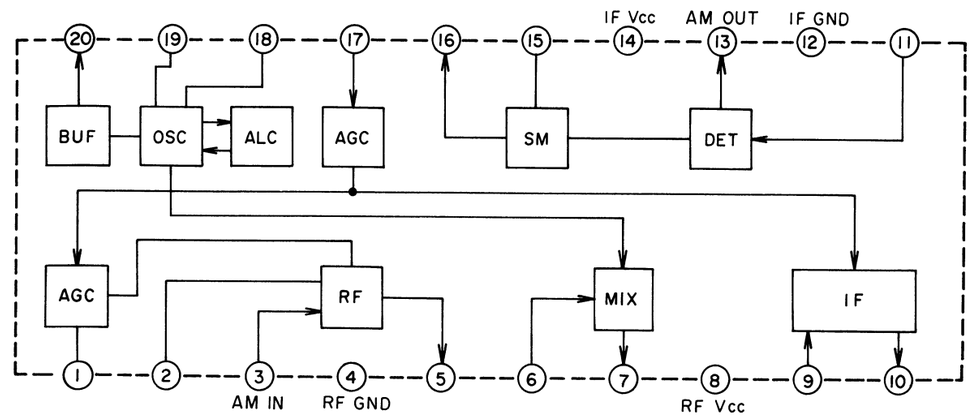
TR1-----2SA1317(S,T,U)

= NPN TRANSISTOR

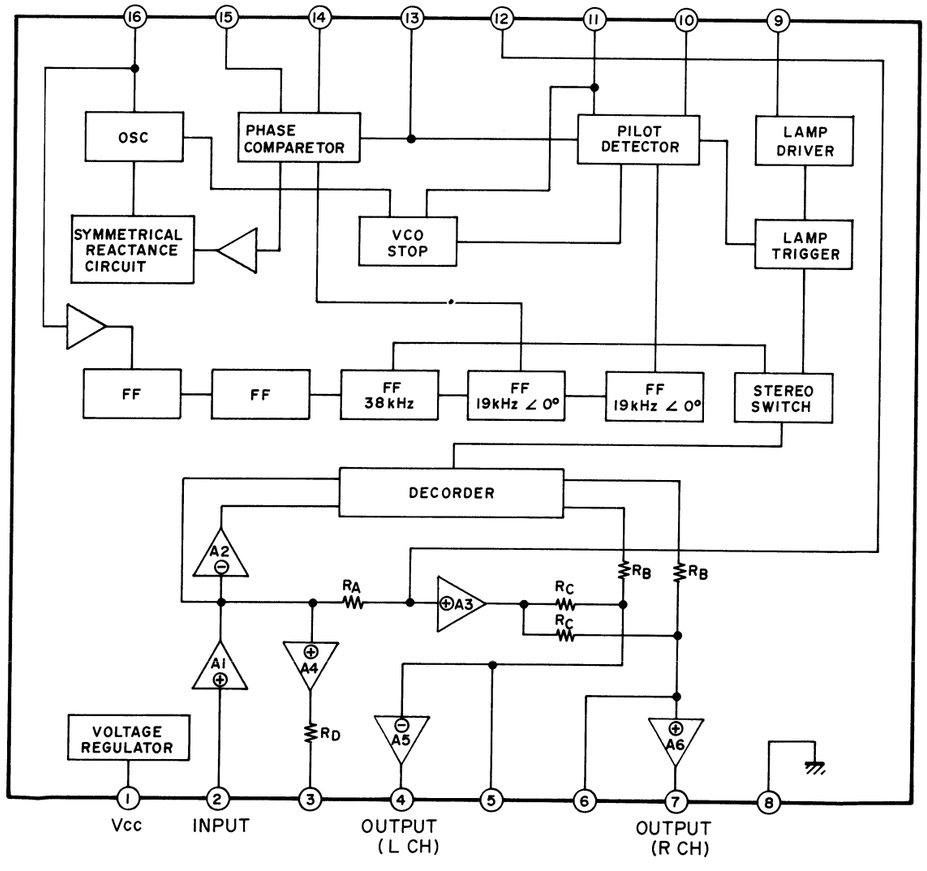
LA1231



LA1245



LA3410



LM7000